The Source of Groundwater and Solutes to Many Devils Wash at a Former Uranium Mill Site, Shiprock, NM

Background:

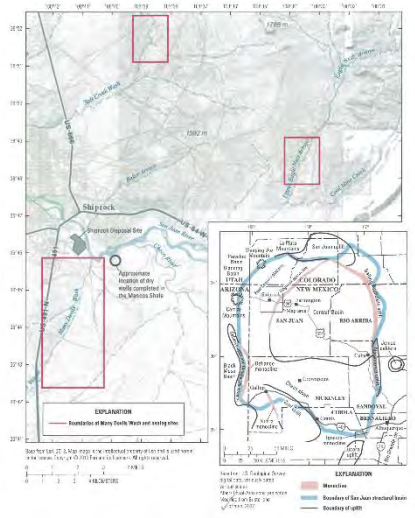
The Shiprock Disposal Site is the location of the former Navajo Mill (Mill), a uranium ore-processing facility, located in the town of Shiprock, New Mexico. Following the closure of the Mill, all tailings and associated materials were encapsulated in a disposal cell built on top of the former Mill and tailings piles. The milling operations, conducted at the site from 1954 to 1968, created radioactive tailings and process-related wastes that are now found in the groundwater.

Results:

- The spatial extent of the Mill affects to the local groundwater were determined by using uranium alpha activity ratios ($^{234}U/^{238}U$ ARs) and sulfur isotopes of sulfate ($\delta^{34}S_{sulfate}$) measured in groundwater samples.
- Age-dating tracers (CFCs and tritium) and stable isotopes of water (δD and $\delta^{18}O$) were used to determine that groundwater in MDW was focused recharge of precipitation.
- A conceptual model of the Mancos Shale weathering was developed from major-ion geochemistry to show that constituents in the groundwater of the MDW watershed were evolved through weathering in ion-exchange reactions.

Objectives:

To increase understanding of the source of water and solutes to the groundwater beneath Many Devils Wash (MDW) and to establish the background concentrations for groundwater that is in contact with the Mancos Shale at the site



Administrative Details:

Timeline – Since 1987

Project Chief – Andrew Robertson (ajrobert@usgs.gov)

Cooperator(s) – Navajo Nation Environmental Protection Agency

Status – Phase 1 completed

Deliverables and other details – Scientific Investigations Report 2016-5031

Navajo Nation Environmental Protection Agency

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Water Resource Assessment of the Rio San Jose Basin, West-Central New Mexico

Background:

Water resources in the Rio San Jose Basin are limited, and development for public supply, mining, agriculture, and commercial activities have the potential to affect the water availability and quality at a basin-wide scale. This study is designed to provide water-resource managers with better information to plan for potential effects of increased or shifting demands and changes of climatic conditions, to fairly administer water rights, and to support sustainable development. To provide these tools and information, it is necessary to understand what surface-water and groundwater resources are available, how these resources are interconnected, and how the resources might be affected by changing stresses.

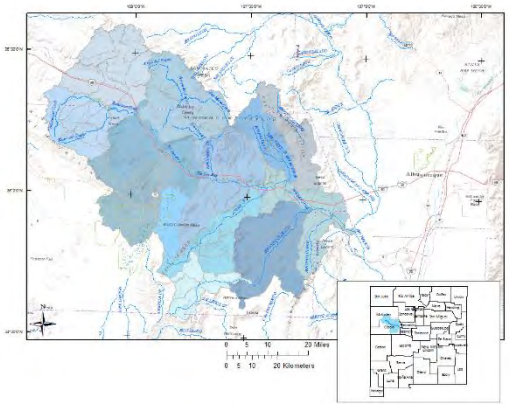
Approach:

- Collect and compile hydrologic information, including groundwater-level measurements, streamflow data, well log information, and aqueous geochemical analysis;
- Construct hydrogeologic framework, potentiometric-surface maps, sources of recharge, groundwater flow paths, and groundwater/surface water exchange;
- Develop coupled groundwater/surface-water flow model (GSFLOW) to investigate aquifer-stream interactions, provide water budgets, and simulate effects of current and potential groundwater and surface-water management and changing climatic conditions.

Objectives:

Characterize the hydrogeologic framework and water resources of the Rio San Jose Basin;

Create a watershed management tool to evaluate the possible regional effects of different water-use and climate scenarios on the basin's water-resources.



Administrative Details:

Timeline – FY2015 to 2019

Project Chief – Andrew Robertson (ajrobert@usgs.gov)

Status – Active

Cooperator(s) – Pueblo of Acoma, Pueblo of Laguna, Bureau of Reclamation

Data and Other Details available at –
http://nm.water.usgs.gov/projects/rio.san.jose